

The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

Paper No. 31

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte MINORU MACHIDA, TOSHIO YAMADA,
TAKESHI NAITO and YUKIHITO ICHIKAWA

Appeal No. 1998-1004
Application 08/401,984

HEARD: March 13, 2001

Before KIMLIN, PAK and WARREN, *Administrative Patent Judges*.

WARREN, *Administrative Patent Judge*.

Decision on Appeal

This is an appeal under 35 U.S.C. § 134 from the decision of the examiner refusing to allow claims 24 through 30 and 38 as amended in the amendment of October 7, 1996 (Paper No. 14), which are all of the claims remaining in the application as claims 1 through 8 and 31 through 37 were cancelled in this amendment. Claim 24 is illustrative of the claims on appeal:

24. An exhaust gas treatment apparatus through which an exhaust gas containing fine particles is passed along a flow direction, comprising:

a first filter comprising a first filter main body, a first counter room provided downstream of the first filter main body, and a second counter room provided upstream of the first filter main body;

a second filter comprising a second filter main body, a first counter room provided downstream of said second filter main body, and a second counter room provided upstream of said second filter main body;

first and second exhaust gas inlets for separately supplying exhaust gas to said first and second filters, respectively, said first and second exhaust gas inlets being connected to and receiving exhaust gas from a common inlet pipe;

first and second exhaust gas outlets for discharging exhaust gas from the first and second filters, respectively;

a process portion isolated from exhaust gas flow through the filters, in which fine particles removed from the filters are fired, said process portion comprising an electric heater and a plate, wherein said plate is provided on said electric heater or said electric heater is embedded in said plate;

transport means for interconnecting each of the second counter rooms to said process portion;

a counter air supply means for supplying a counter flow of air to the first counter rooms, along a flow direction opposite to the flow direction of the exhaust gas;

first and second gas exhaust supply valves provided in the first and second exhaust gas inlets, respectively; and

first and second exhaust gas discharge valves respectively provided in said first and second exhaust gas outlets.

The references relied on by the examiner are:

Sword	1,921,047	Aug. 8, 1933
Kunowich	2,150,687	Mar. 14, 1939
Comstock	2,653,213	Sep. 22, 1953
Friedberg	2,798,928	Jul. 9, 1957
Levendis et al. (Levendis)	5,253,476	Oct. 19, 1993

The examiner has advanced the following grounds of rejection on appeal: the rejection of the appealed claims under 35 U.S.C. § 103 as unpatentable over Levendis, of record prior to the answer; and, the rejection of the appealed claims under 35 U.S.C. § 103 as unpatentable over Levendis taken together with any one of Sword, Kunowich, Comstock and Friedberg, a new ground of rejection in the answer.¹

We affirm each of these grounds of rejection.

¹ Appellants have summarized in the brief (page 7, n.2) the grounds of rejection of record as of the final rejection of June 10, 1996 (Paper No. 10) and the sole ground of rejection under § 103 that remained after the filing of the amendment of October 7, 1996 (*see above* p. 1).

Rather than reiterate the respective positions advanced by the examiner and appellants, we refer to the examiner's answer and supplemental answer, and to appellants' brief, reply brief and supplemental reply brief for a complete exposition thereof.

Opinion

The appealed claims, as represented by claim 24,² are drawn to an exhaust gas treatment apparatus which essentially differs from the apparatus for the same use in the same manner taught in Levendis in that the reference does not specifically disclose an electric burner or heater having the structure of a "plate . . . on said electric heater or said electric heater is embedded in said plate," as specified in the sixth clause of claim 24. Compare, e.g., specification FIGs. **1** and **10**, burner device **6**, with Levendis FIG. **4**, electric burner **24**, FIG. **5B**, electric burner device **60**, and FIG. **8**, burner device **120**. In specification FIG. **10**, it is apparent that flat base plate **62** is positioned on electric heater **50** at the bottom of burner device **6**, which is illustrated as a resistive filament or coil heater (specification, e.g., page 18, line 24, through page 20, line 9). In Levendis FIG. **5B**, the resistive coils of electric heater **62** is shown as an exposed heating element situated on a base plate at the bottom of electric burner device **60**, and Levendis teaches that "[i]n place of electric burner **60** other electric burners may be employed as well within [sic, without] departing from the inventive concept" (col. 5, lines 28-51). In Levendis FIG. **8**, the burner device **120**, positioned at the bottom of system **100** and having a base plate, "may be a coil heater," for example (col. 7, lines 64-66, and col. 8, lines 3-4), but there is no indication of the position of the coil heater in burner device **120**.

In considering this difference between the claimed apparatus encompassed by claim 24 and the apparatus taught by Levendis, on this record, we agree with appellants (reply brief, page 4) that the claim term "plate" should be interpreted as having its ordinary and common dictionary meaning of a flat, smooth rigid body. *See In re Morris*, 127 F.3d 1048, 1055-56, 44 USPQ2d 1023, 1029 (Fed. Cir. 1997). Indeed, we find that one of ordinary skill in this art

² Appellants state in their brief (page 3) that the appealed claims "do not stand or fall together." The examiner finds that appellants separately argued only claims 27 and 30 in the brief (answer, page 3), which position was not challenged by appellants in the reply brief. Thus, we decide this appeal based on appealed claims 24, 27 and 30. 37 CFR § 1.192(c)(7) (1995).

would have so interpreted the term in light of the written description in the specification. *See Morris*, 127 F.3d at 1054-55, 44 USPQ2d at 1027. We note that the examiner has not explained why this claim term is “not at all limited to the use of a ‘flat plate’ structure” (supplemental answer, page 3). *Cf. Morris*, 127 F.3d at 1055-56, 44 USPQ2d at 1028-30 (“Absent an express definition in their specification, the fact that appellants can point to definitions or usages that conform to their interpretation does not make the PTO’s definition unreasonable when the PTO can point to other sources that support its interpretation.”). We do not find any limitation with respect to the material from which the “plate” is made in claim 24, or in any claim dependent thereon.

In view of the base plate at the bottom of the electric heaters common to the claimed apparatus and that of Levendis, both of which are employed for the common purpose of oxidizing, *inter alia*, the soot particulate (*id.*) in diesel exhaust, the basic difference is that, as seen from specification FIG. 10, the resistive coil 50 at the bottom of the claimed heater structure is separated from the area of process container 61 by at least the surface of a covering plate, such as plate 62, while electric heater 62 is shown as an exposed heating element situated on a base plate at the bottom of electric burner device 60 in Levendis FIG. 5B. We find that Levendis discloses that resistive filaments *embedded* in ceramic were known in the art to oxidize accumulated soot particulate (col. 1, lines 13-39). While the ceramic in which the filament was embedded was in the form of a matrix serving as a trap for, *inter alia*, the soot particulate (*id.*), we are of the opinion that one of ordinary skill in this art would have found in Levendis the suggestion to fashion the ceramic covering for a resistive filament or coil heater into any shape, including a solid piece such as a base plate, that would fit the position of the heater in an apparatus and maintain the separation between soot particulate and filament, with the reasonable expectation that soot particulate would be oxidized on the ceramic surface by the embedded filament or coil heater. Thus, *prima facie*, one of ordinary skill in this art would have substituted a ceramic covered resistive filament or coil heater fashioned to fit the bottom of electric burner device 60 in place of electric heater 62 situated on a base plate in Levendis FIG. 5B, because the reference teaches that other electric burners can be employed in this position (col. 5, lines 49-51). Similarly, this person would have used a ceramic covered resistive filament or coil heater at the bottom of burner device 120 in Levendis FIG. 8, where the soot particulate is shown to accumulate.

Accordingly, we conclude that, *prima facie*, one of ordinary skill in the art following the disclosure of Levendis alone and armed with the knowledge in the art as set forth in this reference, would have substituted a ceramic covered resistive filament or coil heater fashioned to fit the bottom of electric burner devices **60** and **120**, which would include incorporation of the heater element in the base plates of these devices, and thus would have reasonably arrived at the claimed invention as encompassed by claim 24.

With respect to the second ground of rejection, we find that each of Sword (e.g., page 1, lines 1-11; page 1, line 99, to page 2, line 49; heating unit **27**, FIGs. **2-7**), Comstock (e.g., col. 1, lines 3-6; col. 2, lines 6-24; col. 3, lines 11-17; electric heating element **48**, FIGs. **4-7**) and Friedberg (col. 1, lines 19-28 and 60-61; col. 2, lines 36-50; heating element **12** in housing **11**, FIGs. **1** and **3**)³ discloses that it was known in the incinerator arts to cover the electric heating element, thus separating it from the combustible material for purposes of protection and incineration efficiency. Therefore, *prima facie*, one of ordinary skill in this art would have found in the combined teachings of Levendis and these references, the reasonable suggestion to cover the electric heating element of Levendis in the reasonable expectation of protecting the electric heating element and thus increasing the incineration efficiency of the apparatus disclosed therein.

Turning now to claims 27 and 30, we interpret the term “partition” in claim 27 as having its common and ordinary dictionary meaning of “[s]omething that separates, such as a partial wall dividing a larger area,” *The American Heritage Dictionary Second College Edition* 906 (1982), because we find that one of ordinary skill in this art would have so interpreted the term in light of the written description in the specification (paragraph bridging pages 25-26) and the specification FIGs. **14** and **15** (partial partition **502** having opening **502a**). However, we find that the common definition includes a *complete* partitioning, such as a wall fully dividing a large area, and thus we will not read into claim 27 the limitation that the “partition” of the transport pipe is a partial one as described in the specification. See *In re Prater*, 415 F.2d 1393, 1404-05, 162 USPQ 541, 550-51 (CCPA 1969). Therefore, the term “partition” as used in claim 27 encompasses

³ A discussion of Kunowich is not necessary to our decision.

within its scope valves **26** and **26'** shown in Levendis FIG. **4**, which, when closed, are full partitions serving the similar purpose of preventing the return of soot particulate containing gas to the filter, as partial partition **502** in specification FIGs. **14 – 16**. See answer, page 7, second full paragraph, and brief, pages 4-6 and 11. Accordingly, appealed claim 27 does not patentably distinguish over Levendis in this respect.

Appealed claim 30 provides that the “filters are axially compressed such that the . . . filter main bodies are air-tightly sealed along the . . . inlets.” We give the term “axially” its common and ordinary dictionary meaning of “[l]ocated on, around, or in the direction of an axis,” *The American Heritage Dictionary Second College Edition* 146 (1982). Indeed, the written description of the specification discloses that “[a]s shown in Fig. 7, the filter main body **20** is secured to an inner wall **201a** of the cylindrical container **201** by seal rings **202, 203** and support rings **204, 205**” wherein “a gasket not shown is arranged between the seal rings **202** or **203** and the filter main body **20**” and the “support rings **204, 205** are secured to the inner wall **201a** of the container **201** . . . in such a manner that the filter main body **20** is compressed in a through hole direction by the support rings **204** and **205**” (page 10). In comparing such an embodiment of the claimed invention as encompassed by claim 30 with Levendis, we find that the reference discloses, with respect to Levendis FIG. **1**, that the particulate trap or filter **14** is held inside casing member **12**, *inter alia*, by two rings with sealing gaskets provided between the rings and filter **14** (col. 3, lines 33-39). We find little difference between the manner in which a particulate trap or filter is fitted inside a casing so as to insure that all of the particulate laden exhaust gas passes through the trap or filter, is disclosed by appellants in their specification and by Levendis, and indeed, each of these descriptions satisfy the language of claim 30 quoted and interpreted above. As noted by the examiner, “claim 30 does not recite ‘support rings’ as a means for sealing the filter elements, as stated in . . . [appellants’] arguments” (answer, page 8, first full sentence; brief, pages 6 and 11). Thus, appealed claim 30 does not patentably distinguish over Levendis.

Accordingly, since a *prima facie* case of obviousness has been established over the applied prior art with respect to appealed claims 24, 27 and 30, we have again evaluated all of the evidence of obviousness and nonobviousness based on the record as a whole, giving due consideration to the weight of appellants’ arguments and the evidence in the Rule 132 Declaration of appellant

Ichikawa. *See generally, In re Piasecki*, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984).

Our consideration of appellants' evidence of nonobviousness in light of their arguments is based on the totality of the record, even though the evidence and argument is in large part not based on any disclosure in their specification. *In re Chu*, 66 F.3d 292, 297-99, 36 USPQ2d 1089, 1094-95 (Fed. Cir. 1995) ("We have found no cases supporting the position that a patent applicant's evidence and/or arguments traversing a § 103 rejection must be contained within the specification."). See brief, page 10.

We agree with appellants (brief, e.g., page 8; reply brief, e.g., pages 3-5) that neither Levendis nor the other applied prior art specifically discloses an electric burner or heater below or embedded in a plate *per se*, as specifically required by appealed claim 24. However, we cannot agree that "all structural components" are not shown in Levendis (brief, page 8) because it is apparent from the Levendis FIGs. **5B** and **8** that a base plate is found at the bottom of electric burner devices **60** and **120**, that other electric heaters can be substituted for those illustrated in these figures, and that a ceramic covered filament, separated from the soot particulate, was used in the art to oxidize soot particulate, as we discussed above. On this evidence in Levendis, *prima facie*, one of ordinary skill in this art would have substituted a ceramic covered resistive filament or coil heater fashioned to fit the bottom of electric burner devices **60** and **120**, which would include incorporation of the heater element in the base plate of these devices.

With respect to appellants' contention that Sword, Comstock and Friedberg cannot be combined with Levendis because they are non-analogous art (reply brief, pages 2-5; supplemental reply brief, pages 2-3), it is apparent that the while these references are not from the field of exhaust gas treatment, they are each concerned with the incineration of combustible materials in apparatus having an electrical heating element in similar manner to Levendis. Thus, one of ordinary skill in this art would have reasonably recognized in this relationship, the suggestion to combine the analogous teachings of these references with respect to the protection and efficiency of the electrical heating element. *See generally, Pro-Mold and Tool Co. v. Great Lakes Plastics Inc.*, 75 F.3d 1568, 1573, 37 USPQ2d 1626, 1629-30 (Fed. Cir. 1996); *In re Clay*, 966 F.2d 656, 658, 23 USPQ2d 1058, 1060 (Fed. Cir. 1992); *In re Keller*, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981)("The test for

obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art.”).

Appellants point to the “critical nature of the plate covered heater according to the claimed invention,” and to the support in the testimony of appellant Ichikawa in the Rule 132 Declaration with respect thereto (brief, pages 4, 9-10; reply brief, pages 5-6; supplemental reply brief, pages 2-3). According to appellants, they have

discovered that if such [fine particulate] carbon compounds are fired directly on a surface of the heater, the heater tends to overheat and, moreover corrode (oxidize). Such overheating and corrosion lead to fracture of the heater. Furthermore, the hydrocarbons present in the particles accelerate corrosion of the heater, thereby worsening the effects of the firing of the fine particles on the heater. The claimed invention utilizes a plate as a shield to prevent direct contact of the particles with the heater, thereby preventing subsequent fracture of the heater. . . . [Brief, page 4.]

Appellants further state that

the claimed invention prevents carbon particulates, non-combusted hydrocarbons, and additionally, metal oxides such as Na and Fe and corrosive components such as sulfides, from being directly burned on the electric heater. Appellants have discovered that it is important not only to prevent direct burning of such components on the heater, as well as deposition of ash components left-over from combustion on the heater, [sic] to prevent corrosive damage thereof. . . . [Reply brief, page 5.]

Appellants still further state that the claimed “structure provides protection against heater oxidation due to overheating caused by the burning of carbon and hydrogen-containing material, e.g., soot that has been backflowed into the . . . [electric heater] portion of the claimed invention” (supplemental reply brief, page 3).

Appellants submit that these advantages “inherently flow from use of” the claimed apparatus as shown in the declaration (brief, page 10).⁴ In his declaration, appellant Ichikawa states in ¶ 3 that

⁴ The examiner expressed several criticisms of the declaration which we have considered (answer, page 8). However, we note that while the examiner submits that one reason the declaration is not persuasive is that “the declaration was not filed in a timely manner” (*id.*) the examiner did not refuse to enter the

I have discovered that when a heater, such as a coil heater, is used in an exhaust gas treatment apparatus without benefit of protection of a plate, the heater may prematurely fail. During use, soot composed of particles trapped by the filters of the apparatus is back-flowed into the process portion and onto the heater. Such soot is formed of carbon and hydrogen containing materials. If the heater is directly exposed to those materials, it oxidizes due to overheating caused by burning of the carbon containing materials. Furthermore, the hydrogen containing materials function to accelerate oxidation of the heater, which also contributes to premature breakage and failure of the heater.

In contrast, according to the claimed invention a plate is provided in combination with a heater, whereby the heater is not directly exposed to the carbon and hydrogen containing materials (such as hydrocarbons) and premature failure of the heater is prevented.

Appellant Ichikawa further states in ¶ 4 that “none of the cited prior art discloses or suggests our claimed invention or its attendant advantages;” that the “prior art does not teach to one of ordinary skill in the art, and does not teach to me personally how to make our claimed invention;” and that the claimed invention “as a whole would not have been obvious at the time the invention was made” to one of ordinary skill in the art.

We have carefully considered appellant Ichikawa’s testimony in light of the knowledge in the prior art as set forth in Levendis and the summary of the invention disclosed therein (cols. 1-2). The composition of the particulate matter in exhaust gas from diesel engines was well known to include, *inter alia*, soot particulate which is “‘sticky’ and adheres quite readily to” surfaces, thus accumulating on the surface of ceramic traps or filters containing embedded resistive filaments whereon it formed hot spots during the high temperature regeneration of the ceramic traps or filters (col. 1). The oxidation of the particulate matter in a burner away from traps or filters in the apparatus of Levendis is conducted at a lower temperature (col. 2). However, even so, one of ordinary skill in this art would have reasonably observed during operation of the Levendis apparatus that the soot particulate is “sticky” and adherent even at the lower temperature, thus accumulating on the surfaces of the burner including any exposed resistive filaments or coils of the heating element, such as shown in Levendis FIG. 5B, with the obvious result that the expected residue remained on such elements after the accumulated hydrocarbon particulates have been burned.

declaration. See 37 CFR § 1.195; Manual of Examining Practice and Procedure § 716 (6th ed., Rev.

Accordingly, we find that one of ordinary skill in this art would have been aware of such problems caused by exposed resistive filament or coil of the heating element noted by appellant Ichikawa in ¶ 3 of the declaration by mere observation of the performance of the exposed heating elements in the apparatus of Levendis, and would have turned to the use of a ceramic covered heating element which was already known in the art of treating exhaust gas as set forth by Levendis, or to other covered heating elements known in other incineration arts as shown by Sword, Comstock and Friedberg; the shape of the cover for the heating element being suggested by the base plate shape of the bottom of the burners illustrated in the Levendis figures where the soot particulate accumulates. *See In re Ludwig*, 353 F.2d 241, 243, 147 USPQ 420, 421 (CCPA 1965); *In re Goodman*, 339 F.2d 228, 232-33, 144 USPQ 30, 33-34 (CCPA 1964). We find no evidence or persuasive argument of record which establishes the criticality of the plate shape of the cover for the heater element specified in appealed claim 24 with respect to a different function or an unexpected result, over any of the cover shapes specifically taught by Levendis or the other applied references. *See Chu, supra*.

We further find that the opinion expressed by appellant Ichikawa in ¶ 4 of the declaration addresses the ultimate legal issue of obviousness in this case and thus is entitled to no weight. *In re Reuter*, 651 F.2d 751, 759, 210 USPQ 249, 256 (CCPA 1981).

We have again reconsidered the record with respect to appealed claims 27 and 30, but remain of the opinion we expressed above with respect to these claims.

Accordingly, based on our consideration of the totality of the record before us, we have weighed the evidence of obviousness found in Levendis alone and as combined with Sword, Kunowich, Comstock and Friedberg, with appellants' countervailing evidence of and argument for nonobviousness and conclude that the claimed invention encompassed by appealed claims 24 through 30 and 38 would have been obvious as a matter of law under 35 U.S.C. § 103.

The examiner's decision is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED

EDWARD C. KIMLIN
Administrative Patent Judge

CHUNG K. PAK
Administrative Patent Judge

CHARLES F. WARREN
Administrative Patent Judge

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